
RED RIVER AUTHORITY
THE STATE OF TEXAS
OF TEXAS

Red River Authority of Texas

Nutrient Criteria Standard Development

Allen M. Pappas
Red River Authority of Texas, CRP Project Manager
Amarillo Basin Advisory Committee Meeting
March 22, 2011

Agenda

- What are nutrients?
- Nutrient criteria – national level
- TCEQ's response
- Limitations
- Looking toward the future

What are Nutrients?

Nutrient

- An element or compound essential to life, including carbon, oxygen, nitrogen, phosphorus, and many others.
- That portion of any element or compound in the soil that can be readily absorbed and assimilated to nourish growing plants, e.g., nitrogen, phosphorus, potassium, iron.

- Previously were only regulated with narrative criteria, not numerical

What are Nutrients?

Total phosphorus

- the sum of both organic and inorganic phosphorus.

Total Nitrogen

- the sum of both organic and inorganic nitrogen.

Chlorophyll-*a*

- a photosynthetic pigment which is found in all green plants. The concentration of chlorophyll a is used to estimate phytoplankton biomass in surface water.

What are Nutrients?

Secchi disk depth

- A relatively crude measurement of the turbidity (cloudiness) of surface water. The depth at which a *Secchi Disc* (Disk), which is about 10-12 inches in diameter and on which is a black and white pattern, can no longer be seen.

Carlson Tropic State Index (TSI)

- measure of *Eutrophication of a body of water using a combination of* measures of water transparency or turbidity (using *Secchi Disk depth recordings), Chlorophyll–a concentrations,* and total phosphorus levels.

Nutrient Criteria
National Level

EPA

- 1998 mandate
- Criteria by 2004
- Published national guidance
- Very flexible

Legal Matters

- Florida
- Wisconsin and Kansas

TCEQ's Response

- Submitted plans to EPA in 2001 and 2006
- Convened advisory workgroup
- Reservoirs were a priority
- Based on historical conditions in main pool
- Proposed for 93 reservoirs
  - Stand-alone chl-*a* criteria
  - Chl-*a* criteria and screening levels (TP, transparency)

TCEQ's Response

2010 Texas Water Quality Standards

- Adopted stand-alone chl-*a* numeric nutrient criteria for 75 reservoirs
  - Reservoirs with ≥ 30 sampling dates
  - 1990-2008, in some cases older data
  - Applicable only at main pool/dam station

Logistical Limitations

Red River Basin

0208	Lake Crook
0209	Pat Mayse Reservoir
0210	Farmers Creek Reservoir
0212	Lake Arrowhead
0213	Lake Kickapoo
0215	Lake Diversion
0217	Lake Kemp
0219	Lake Wichita
0834	Lake Amon G. Carter

Logistical Limitations

Sampling

- Often done quarterly
- 8+ years to create a viable data set

Alternatives

- Increased monitoring
- Increased workforce
- Cost

Analytical Limitations

Changes in field methodologies

- Specifically chl-*a*
- Spectrophotometric to fluorometric
- Not treated equally by EPA
- Created “censored” data sets
- Contributes to logistical limitations

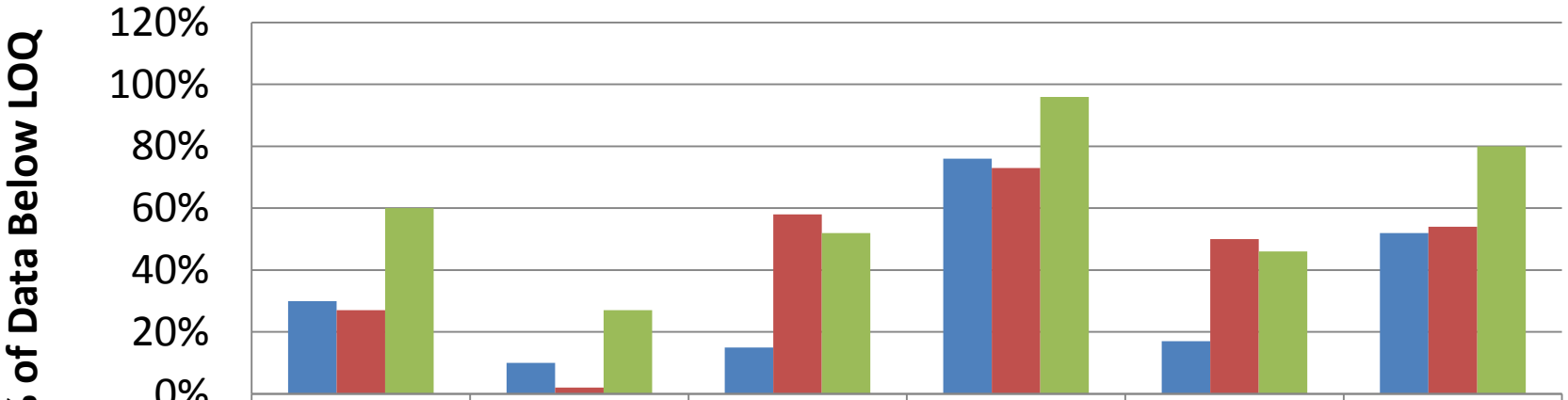
Analytical Limitations

AWRL – Ambient Water Reporting Limit

- LOQ – Limit of Quantitation
  - Have increased over the past decade
  - NELAC/NELAP
  - More stringent QA/QC requirements
- Has resulted in “censored” datasets

Analytical Limitations

Percentages of Data Reported Below the LOQ in SWQMIS



	TP 0.06ppm	TKN 0.2ppm	Nitrate 0.05ppm	Nitrite 0.05ppm	Nitrate+ Nitrite 0.05ppm	OP 0.0.4ppm
Stream	30%	10%	15%	76%	17%	52%
Estuaries	27%	2%	58%	73%	50%	54%
Reservoirs	60%	27%	52%	96%	46%	80%

Analytical Limitations

Total Nitrogen

- Two options: Direct versus Indirect
  - Direct – Combustion
  - Indirect – Calculation
    - TKN
    - Nitrate+Nitrite
    - Ammonia
- Not all parameters are analyzed
- Increased error with calculation

Analytical Limitations

Total Phosphorus

- AWRL/LOQ = 0.06ppm
  - Nationally looking between 0.01-0.02ppm
  - Some states going to 0.005ppm = 5ppb
  - Nutrient criteria from EPA is well below 0.06ppm
  - Capabilities of CRP partners is limited

Looking Towards the Future

The plan

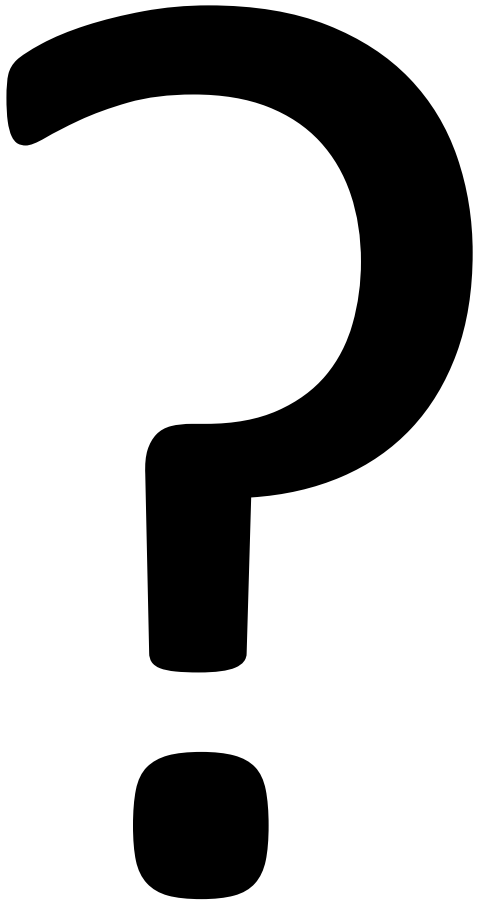
- Collect more nutrient parameters
- Lowering the LOQ at partner laboratories
- Continue to develop and revise criteria

Looking Towards the Future

Permitting

- How will this effect WWTP's
- Cost associated with nutrient removal
- Feasibility
- How to cover the cost?
  - Grants?
  - Increased utility fees?
- Monitoring requirements
  - Bacteria

Questions



Red River Authority of Texas

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Contact Information:
3000 Hammon Road, Wichita Falls, TX 76310-7500
Phone Number: (940) 723-1717 • Fax Number: (940) 723-6529
Hours of Operation: Monday – Friday 08:00 – 17:00 • Emergency Laboratory Services: (940) 636-8024